

ABSTRACT

A seat belt load limiter employs a magnetostrictive sensor to detect the elastic loading and plastic deformation of a torsion rod forming part of a seat belt retractor. A magnet and a coil are placed about or adjacent to the torsion rod. When the torsion rod undergoes elastic or plastic strain, an electrical voltage is induced in the coil which is used to detect elastic or plastic strain of the torsion rod. A vehicle safety system uses the output of the magnetostrictive sensor to inform the vehicle operator when the seat belt load limiter is in need of replacement. The output of the magnetostrictive sensor as processed by the vehicle safety system can also be used to detect a situation where the seat occupant is not restrained by the seat belt and to make an airbag deployment decision.